

CLAIMS

1. A tube electroforming method comprising the steps of: forming an electrodeposit material or a surrounding material around a thin wire material by electroforming; and removing the thin wire material from the electrodeposit material or the surrounding material,

characterized in that the thin wire material is removed either by heating the electrodeposit material or the surrounding material to thermally expand the material or by cooling the thin wire material to contract the material, so as to form a clearance between the electrodeposit material or the surrounding material and the thin wire material, followed by gripping and pulling the thin wire material, sucking the material, physically pushing away the material, or blowing a gas or a liquid to push away the material.

2. A tube electroforming method comprising the steps of: forming an electrodeposit material or a surrounding material around a thin wire material by electroforming; and removing the thin wire material from the electrodeposit material or the surrounding material,

characterized in that the thin wire material is removed either by submerging the material into a liquid or by applying the liquid to the material so that a place with which the thin wire material and the electrodeposit

material or the surrounding material are brought into contact is formed so as to easily slip, followed by gripping and pulling the thin wire material, sucking the material, physically pushing away the material, or blowing 5 a gas or a liquid to push away the material.

3. A tube electroforming method comprising the steps of: forming an electrodeposit material or a surrounding material around a thin wire material by 10 electroforming; and removing the thin wire material from the electrodeposit material or the surrounding material, characterized in that the thin wire material is removed by pulling the material from one end or both ends, deforming the material so as to reduce a sectional area 15 thereof, and forming a clearance between the thin wire material and the electrodeposit material or the surrounding material, followed by gripping and pulling the thin wire material, sucking the material, physically pushing away the material, or blowing a gas or a liquid to push away the 20 material.

4. The tube electroforming method according to claim 1, 2 or 3, characterized in that an amount of an end-portion- 25 side electrodeposit or surrounding material to be formed on the thin wire material is increased.

5. The tube electroforming method according to
claim 3,

characterized in that a deformation amount of a
lateral distortion at a time when the thin wire material is
5 pulled and extended outwards is 5% or more of the sectional
area.

10 6. A tube electroforming method comprising the
steps of: forming an electrodeposit material or a
surrounding material around a thin wire material by
electroforming; and removing the thin wire material from
15 the electrodeposit material or the surrounding material,

characterized in that the thin wire material is
melted with heat or a solvent and removed.

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7. The tube electroforming method according to
claim 1, 2, 3, 4, 5 or 6,

characterized in that the thin wire material
including a conductive layer disposed on an outer surface
20 thereof is used, and the thin wire material is removed so
that the conductive layer remains on an inner surface of a
tube by electroforming.

25 8. The tube electroforming method according to
claim 1, 2, 3, 4, 5 or 6,
characterized in that the thin wire material is
used in which at least two conductive layers constituted of

different materials are formed on an outer surface of the material, the electrodeposit material or the surrounding material is brought into close contact with the outer conductive layer of the thin wire material, and the thin wire material is removed so that the inner conductive layer remains on an inner surface of the tube by electroforming.

9. The tube electroforming method according to claim 1, 2, 3, 4, 5, 6, 7 or 8,

characterized in that an inner shape of a hollow portion formed by removing the thin wire material from the electrodeposit material or the surrounding material has a circular sectional shape or a polygonal sectional shape.

10. The tube electroforming method according to claim 1, 2, 3, 4, 5, 6, 7, 8 or 9,

characterized in that the tube by electroforming includes a plurality of hollow portions formed by removing the thin wire material.

11. The tube electroforming method according to claim 10,

characterized in that a partition wall member formed by disposing a conductive layer on an outer surface of an insulator is disposed between the hollow portions, whereby each portion forming a periphery of each hollow portion independently conducts electricity.

12. A tube by electroforming produced by forming an electrodeposit material or a surrounding material around a thin wire material by electroforming, and removing the
5 thin wire material from the electrodeposit material or the surrounding material,

characterized in that a hollow portion is formed by removing the thin wire material from the electrodeposit material or the surrounding material, an inner diameter of
10 the hollow portion is 10 μm or more and 85 μm or less, when an inner shape of the hollow portion has a circular
15 sectional shape, and a diameter of an inscribed circle of the hollow portion is 10 μm or more and 85 μm or less, when the inner shape of the hollow portion has a polygonal sectional shape.

13. The tube by electroforming according to claim
12,

characterized in that a thickness of the tube is 5
20 μm or more and 50 μm or less.

14. The tube by electroforming according to claim
12 or 13,

characterized in that an inner surface of the tube
25 is provided with a conductive layer constituted of a material different from that of the electrodeposit material or the surrounding material.

15. The tube by electroforming according to claim
12 or 13,

characterized in that an inner surface of the tube
5 is provided with a conductive layer constituted of a
material different from that of the electrodeposit material
or the surrounding material, and a further conductive layer
constituted of a material different from that of the
conducting layer is disposed between the electrodeposit
10 material or the surrounding material and the conductive
layer.

16. The tube by electroforming according to claim
12, 13, 14 or 15,

15 characterized in that: there are a plurality of
hollow portions formed by removing the thin wire material.

17. The tube by electroforming according to claim
16,

20 characterized in that a partition wall member
formed by disposing a conductive layer on an outer surface
of an insulator is disposed between the hollow portions,
whereby each portion forming a periphery of each hollow
portion independently conducts electricity.

25

18. The tube by electroforming according to claim
17,

characterized in that the conductive layer disposed on the outer surface of the partition wall member forms a part of the hollow portion.

5 19. The tube by electroforming according to claim 17 or 18,

characterized in that a portion of the partition wall member disposed between the hollow portions disposed adjacent to each other has a thickness of 5 μm or more and 10 50 μm or less.

20. A thin wire material for production of a tube by electroforming produced by forming an electrodeposit material or a surrounding material around the thin wire material by electroforming, and removing the thin wire material from the electrodeposit material or the surrounding material,

characterized in that an outer diameter of the thin wire material is 10 μm or more and 85 μm or less, when 20 an outer shape of the thin wire material has a circular sectional shape, a diameter of an inscribed circle is 10 μm or more and 85 μm or less, when the outer shape of the thin wire material has a polygonal sectional shape, and a deformation amount of a lateral distortion at a time when 25 the thin wire material is pulled and extended outwards is 5% or more of a sectional area.

21. The thin wire material for the production of
the tube by electroforming according to claim 20,
characterized in that an outer surface of the
material is provided with a conductive layer constituted of
5 a material different from that of the electrodeposit
material or the surrounding material.

22. The thin wire material for the production of
the tube by electroforming according to claim 20,
10 characterized in that an outer surface of the
material is provided with a conductive layer constituted of
a material different from that of the electrodeposit
material or the surrounding material, and a further
conducting layer constituted of a material different from
15 that of the conductive layer is disposed between a base
member of the thin wire material and the conductive layer.

23. The thin wire material for the production of
the tube by electroforming according to claim 20, 21 or 22,
20 characterized in that there are opposite end
portions on which any conductive layer is not disposed.

24. The thin wire material for the production of
the tube by electroforming according to claim 20, 21, 22 or
25 23,
characterized in that an outer shape of the
material is formed into a circular sectional shape or a

polygonal sectional shape.